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A DUAL DIRECTION OVER-VOLTAGE AND OVER-CURRENT IC
PROTECTION DEVICE AND ITS CELL STRUCTURE

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ABSTRACT

A two terminal ESD protection structure formed by
an alternating arrangement of adjacent p-n-p-n-p
10 semiconductor regions provides protection against both
positive and negative ESD pulses. When an ESD pulse
appears across the two terminals of the ESD protection
structure, one of the inherent n-p-n-p thyristors is
triggered into a snap-back mode thereby to form a low
15 impedance path to discharge the ESD current.

Some embodiments of the ESD protection structure
of the present invention have an enhanced current
handling capability and are formed by combining a
number of standard cells. The standard cells include a
20 corner cell, a center cell and an edge cell which are
arranged adjacent each other to form an ESD protection
structure which provides for current flow from across
many locations therein.

Some embodiments of the ESD protection structure
25 of the present invention include a network consisting
of a pair of current sources, e.g. back-to-back zener
diodes, each connected in series with a resistor to
control the trigger voltage of the ESD protection
structure.

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